



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,925	01/30/2002	Norihiro Inagaki	218790US0DIV	7761

22850 7590 09/26/2003

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

TSOY, ELENA

ART UNIT PAPER NUMBER

1762

DATE MAILED: 09/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/058,925	INAGAKI ET AL.	
	Examiner	Art Unit	
	Elena Tsoy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2003 and 18 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4,6-11 and 13-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4,6-11 and 13-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

1. Amendment filed on July 25, 2003 and August 18, 2003 has been entered. Claims 5, 12 have been cancelled. New claims 14-20 have been added. Claims 4, 6-11, 13-20 are pending in the application.

Specification

2. The objection to the disclosure because of informalities has been withdrawn.

Claim Objections

3. Objection to claim 13 because of informalities has been withdrawn.

Claim 4 is objected to because of the following informalities: "reacting a silane agent coupling with the oxygen ..." in step b, line 1, seems to be incorrect. Appropriate correction is required. For examining purposes the phrase was interpreted as : "reacting a silane coupling agent with the oxygen ...".

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4, 6-11, 13-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4, step c, a phrase "*plasma polymerizing the resulting product* in a plasma atmosphere **with** an organic silane compound and oxygen thereby forming a SiOx thin film on the surface of said polypropylene film having said tuning molecular chains bonded therein" renders the claim indefinite because it is not clear whether the **silane coupling agent** (which is in

Art Unit: 1762

fact the resulting product) is polymerized also to SiOx or not. For examining purposes the phrase was interpreted step before the amendment.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 4, 6, 7, 13, 15, 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (US 5,763,028) in view of Felts et al (US 5364,665), Ogawa et al (US 5,695,836) and Saiki et al (US 4,001,870), as applied above, and further in view of Cahalan et al (US 5,229,172).

Matsumoto et al in view of Felts et al, Ogawa et al and Saiki et al are applied here for the reasons of record as set forth in Paragraph No. 4 of the previous Office Action (Paper No. 7). fail to teach that the plasma treatment is performed using argon plasma.

Matsumoto et al in view of Felts et al, Ogawa et al and Saiki et al fail to teach that the plasma treatment is performed using argon plasma.

Cahalan et al teach that a polymeric surface such as PP surface (See column 5, lines 10, 14-15) can be provided with oxygen containing groups including C-O form (e.g. hydroxyl groups) (See column 6, lines 46-51) either by using oxygen containing plasma or inert argon plasma since sufficient oxygen remains in the vacuum chamber (See column 5, lines 62-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used argon plasma for treating PP surface in a method of Matsumoto et al in

Art Unit: 1762

view of Felts et al, Ogawa et al and Saiki et al with the expectation of providing the desired content of hydroxyl groups on the surface, since Cahalan et al teach that a polymeric surface such as PP surface can be provided with oxygen containing groups including C-O form (e.g. hydroxyl groups) either by using oxygen containing plasma or inert argon plasma since sufficient oxygen remains in the vacuum chamber.

As to claim 15, Matsumoto et al further teach that the thickness of the silicon oxide layer is preferably 50-6000 angstroms (5-600 nm), and a particularly preferable thickness is 100-1500 angstroms (10-150 nm) (See column 5, lines 29-33).

As to claim 16, Matsumoto et al further teach that the PP film is non-oriented PP film (See column 10, lines 9-10).

8. **Claims 8-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (US 5,763,028) in view of Felts et al (US 5364,665), Ogawa et al (US 5,695,836), Saiki et al (US 4,001,870) and Cahalan et al (US 5,229,172), as applied above, and further in view of Komoto et al (US 6,376,559).

Matsumoto et al in view of Felts et al, Ogawa et al, Saiki et al and Cahalan et al fail to teach that the silane coupling agent is represented by claimed formula $-(R^1O)_n-Si-R^2_{(4-n)}$ wherein n is 1-4 (Claim 8); the reaction between the hydroxyl groups introduced onto PP surface and the silane coupling agent is performed by immersing the PP film in an alcohol solution of the silane coupling agent, and then heating the PP film coated with the alcohol solution (Claim 9) at 50-80°C (Claim 11); the concentration of the silane coupling agent in the alcohol solution is in the range of 0.1-10 % by weight (Claim 10).

Komoto et al teach that a silane coupling agent such as methyltrimethoxysilane, methyltriethoxysilane, dimethyldimethoxysilane (which can be represented by general formula as claimed) (See column 9, lines 33-49) may be used for chemically bonding silica sol (See column 9, line 7) to an organic resin by introducing functional groups onto the surface of the silica sol, then the introduced groups react with the resin thereby chemically bonding silica sol to the resin through the silane coupling agent (See column 9, lines 17-33). The reaction of functional groups on silica sol surface with alkylalkoxysilane coupling agent may be carried out in alcohol (See column 41, lines 63-65) and at a temperature 20-100⁰C (See column 10, lines 51-58) with the amount of alkylalkoxysilane coupling agent being 1-40 wt % (See column 9, lines 49-51). Saiki et al, as was discussed above, show that a silicon dioxide contains on its surface Si-OH groups (See column 4, lines 30-40). In other words, reaction of alkoxy groups of the alkylalkoxysilane coupling agent with hydroxy groups on the surface may be carried out in alcohol at a temperature 20-100⁰C.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used alkylalkoxysilane coupling agent such as methyltrimethoxysilane, methyltriethoxysilane, dimethyldimethoxysilane (which can be represented by general formula as claimed) in an amount of 1-40 wt % instead of chlorosilane coupling agent in a method of Matsumoto et al in view of Felts et al, Ogawa et al, Saiki et al and Cahalan et al for treating any surface having hydroxyl groups including a plasma treated PP surface and silica oxide surface in an alcohol at temperature 20-100⁰C with the expectation of providing the desired chemical bonding of the alkylalkoxysilane coupling agent to the hydroxyl groups, as taught by Komoto et al.

Art Unit: 1762

9. **Claims 14, 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (US 5,763,028) in view of Felts et al (US 5,364,665), Ogawa et al (US 5,695,836), Saiki et al (US 4,001,870) and Cahalan et al (US 5,229,172), as applied above, and further in view of CH 681530.

Matsumoto et al in view of Felts et al, Ogawa et al, Saiki et al and Cahalan et al fail to teach that the thickness of PP base film is 10-50 microns (Claim 14); the PP base film is uniaxially oriented film (Claim 17).

CH 681530 teaches that laminates comprising mono- or biaxially oriented PP base film of 8-2000 microns and SiO_x layer of 5-500 nm may be used for making containers with barrier properties.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used mono- or biaxially oriented PP base films of 8-2000 microns and SiO_x layer of 5-500 nm in a laminate of Matsumoto et al in view of Felts et al, Ogawa et al, Saiki et al and Cahalan et al for the use in food containers with the expectation of providing the desired barrier properties, as taught by CH 681530.

Response to Arguments

10. Applicants' arguments filed July 25, 2003 and August 18, 2003 have been fully considered but they are not persuasive.

(A) Applicants argue that reference of Felts et al teaches away from applicants' invention because it discloses oxygen as a necessary and required medium, and does not teach argon plasma.

The Examiner respectfully disagrees with this argument. Felts et al does not teach away because oxygen is a necessary and required medium for depositing SiO_x layer from silane compound and oxygen using plasma not only in Felts et al but also in applicants' invention.

(B) Applicants argue that even in Cahalan et al et al oxygen is required in addition to argon plasma.

Applicants' invention also requires oxygen in addition to argon plasma, since without oxygen functionalities of claim 6 cannot be formed.

(C) Applicants argue that Saiki et al is not concern with PP film.

Saiki is relied upon by the Examiner to show that silicon oxide layer can be bonded to polyimide surface through silane coupling agent without plasma pretreatment since it has inherently imino groups.

(D) Applicants argue that Ogawa et al teaches an antistatic film so it is not comparable to gas barrier films.

The Examiner respectfully disagrees with this argument. Ogawa et al is relied upon by the Examiner to show that PP surface in contrast to polyimide surface having reactive imino functionalities, PP is inert and requires plasma treatment for introducing reactive functionalities.

(D) Applicants argue that even in Komoto et al teaches a completely nonanalogous method since it relates to chemically bonding silica sol to an organic resin.

The Examiner respectfully disagrees with this argument. Komoto et al is analogous art since silica sol is a silicon oxide having Si-OH groups on the surface, and chemical bonding of silica sol to an organic resin through a silane coupling agent is substantially similar to bonding of SiO_x layer having Si-OH groups on the surface to an organic resin.

Art Unit: 1762

It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Komoto et al is reasonably pertinent to the particular problem with which the applicant was concerned.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is (703) 605-1171. The examiner can normally be reached on Mo-Thur. 9:00-7:30, Mo-Thu.

Art Unit: 1762

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

ET
Elena Tsoy
Examiner
Art Unit 1762

September 9, 2003

Shrive P. Beck
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700